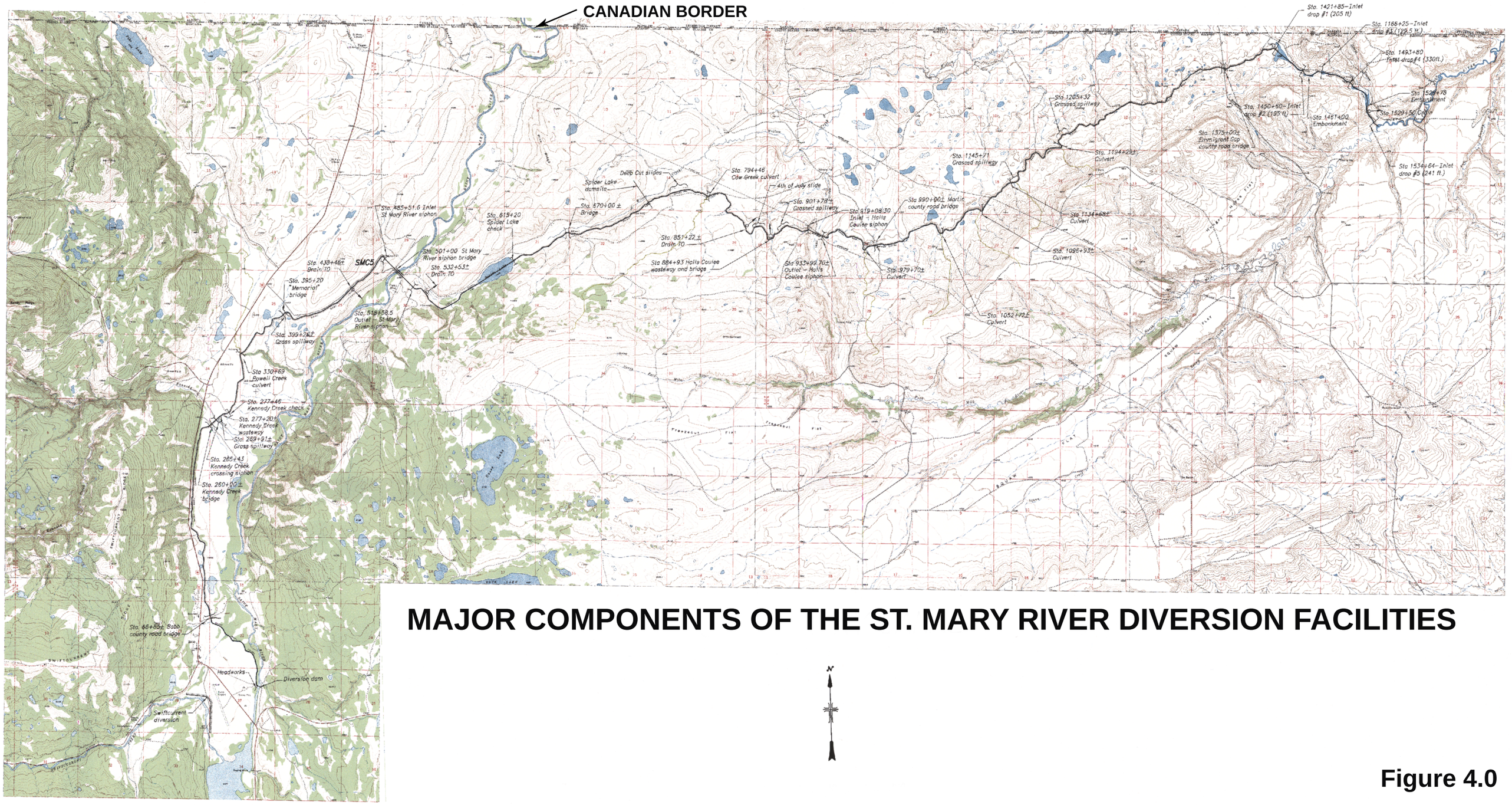
4.0 OVERVIEW OF INDIVIDUAL FACILITY COMPONENTS

In this section of the report, a summary of the existing conditions and deficiencies, as reported by others and as observed directly be members of the TD&H team, has been provided on each of the major hydraulic structures, as well as the conveyance canal. Portions of some structures could not be fully assessed due to standing water, i.e. the Kennedy Creek Siphon and the plunge pool of each hydraulic drop. In such cases, reliance was made on previous inspections conducted by others under optimum conditions. The locations of these structures are shown on Figure 4.0.

In addition, a review has been made of the BOR's repair or replacement alternatives and estimated construction costs for each structure. Generally at this stage, the BOR's efforts to date reflect only "appraisal level" designs and cost estimates for budgetary purposes. More accurate designs and cost estimates would generally be developed during Feasibly Studies and Preliminary Engineering Reports as unknowns are resolved and a recommended alternative is selected. We have provided input to additional alternatives we believe have merit and that should be considered in the subsequent studies. Some of these alternatives were not considered by the BOR, while others were considered but dismissed. These alternatives may represent an initial cost savings during construction and throughout the life of the structure as O&M costs. Our opinions are based on recent projects and past experiences with similar structures. A full evaluation and cost comparison, however, cannot be made at this time.

Review of the BOR's construction and project costs for each structure were cursory in nature and limited to obvious omissions, questionable quantities or unit prices and math errors, which may impact realistic funding appropriations. Due to the preliminary nature of the BOR's work to date and the Project itself, it is not possible to prepare independent comparative cost estimates.



MAJOR COMPONENTS OF THE ST. MARY RIVER DIVERSION FACILITIES

Figure 4.0

The BOR's approach to cost estimating at the appraisal-level is to determine the estimated construction costs including mobilization and to increase them by 10 to 15% for unlisted items. This subtotal is increased by 25% for contingencies and increased again by 37% for non-contract costs. The final estimate is between 1.88 to 1.97 times the original construction costs. For this type of project, private consultants typically use a 20% construction contingency and 20% for design fees and studies. The BOR's Cost Estimating Handbook (BOR, 1989) defines unlisted items, contingencies, and non-contract items as follows:

- Unlisted Items – Percentage allowance for additional items of work which will appear in the final design required for a fully finished feature.
- Contingencies – Percentage allowance to cover minor differences between actual and estimated quantities, unforeseeable difficulties at the site, possible minor changes in the plans, and other uncertainties.
- Non-contract Costs – Non-contract activities are usually based on a percentage of the construction cost. Non-contract costs include: planning, investigations, designs and specifications, contract administration, water rights, environmental permits, and rights-of-ways.

In our opinion, comparisons between repair costs and the costs to replace a given structure should be made cautiously. Actual repair costs can often exceed estimated replacement costs due to unforeseen conditions not fully realized until exposed during construction. Additional contingencies must be planned ahead to account for these potential unknowns. When replacement and repair costs are comparable, it is typically prudent to plan and budget for replacement.

It is not the intent of this report to criticize or endorse the BOR's previous work and reports or pass judgment on the BOR's design approach or methodologies. This report focuses on the infrastructure replacement and rehabilitation of the St. Mary Diversion Facilities necessary to restore the project as a reliable source of water to North Central Montana. To achieve this, it is necessary to summarize existing conditions and deficiencies and review preexisting information and studies. We have provided additional information when prudent so that future decisions can be made effectively.